

CHAPTER 7

PRESENT WEATHER SENSOR

SECTION I. DESCRIPTION AND LEADING PARTICULARS

7.1.1 INTRODUCTION

The ASOS present weather sensor is a fully automated sensor that monitors and reports the current precipitation state. The present weather sensor uses weather-particle-induced optical scintillation of an infrared emitter diode (IRED) system to identify precipitation state and type (rain, snow, drizzle, etc) and measure precipitation intensity. The ASOS present weather sensor reports three precipitation conditions to the ACU: rain, snow, and precipitation undetermined. The present weather sensor also reports the intensity of the precipitation as light (-), moderate, or heavy (+). The omission of the plus or minus indication identifies the current precipitations as moderate. Refer to the ASOS Ready Reference Guide for present weather code designators.

7.1.2 PHYSICAL DESCRIPTION

7.1.2.1 General. The present weather sensor (Figure 7.1.1) contains two major assemblies: a U-shaped frame assembly and a main electrical enclosure assembly. The transmitter and receiver sensor heads are mounted at opposite ends of the frame assembly, 1 meter apart. The main electrical enclosure assembly houses all associated electronics components including the power supplies. A cable assembly is routed through the U-shaped frame assembly and connects the main electrical enclosure to the transmitter and receiver heads. The cable assembly has two connectors: J4 and J5. Connector J4 is connected to the receiver and connector J5 is connected to the transmitter. A hinge plate assembly is used to attach the sensor to the mounting support and enables the sensor to be lowered to a horizontal position for easier maintenance of the frame assembly.

7.1.2.2 Frame Assembly. The frame assembly holds the transmitter and receiver heads, which contain the optical subassemblies that determine the different types of precipitation. An IRED with a die size 0.4 mm square is used as a source of infrared radiation. The transmitter and receiver heads use 175 mm/f3.5 cemented achromatic lenses. A 1 mm horizontally-oriented slot and an infrared filter (No. 87C) are located behind the receiver lens. A positive-intrinsic-negative (PIN) photodiode with a 2.75 mm square area provides infrared detection. The frame assembly is replaced as a field replaceable unit (FRU).

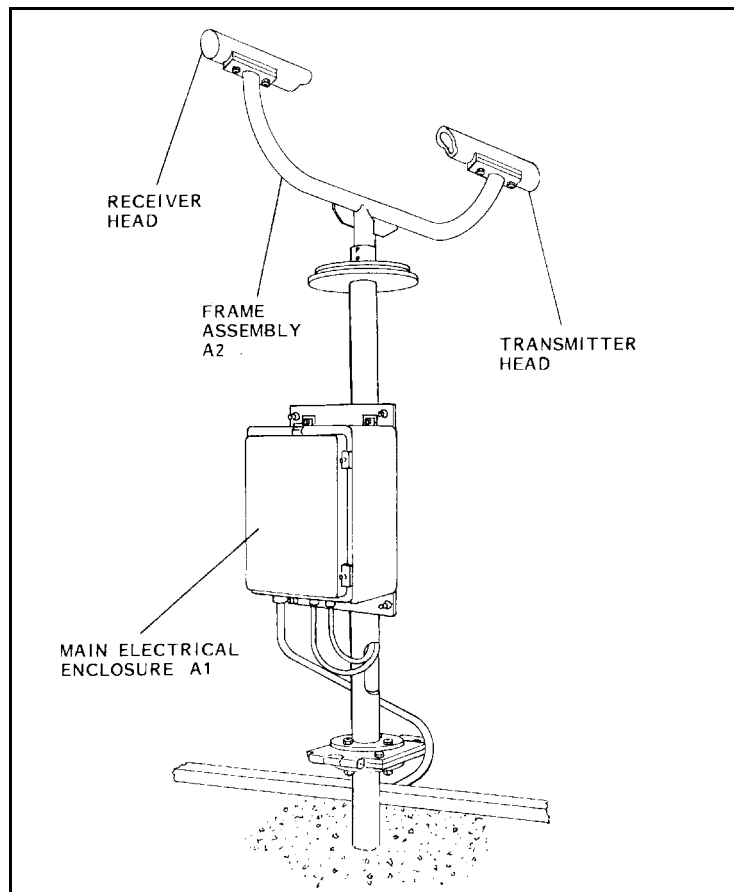


Figure 7.1.1. Present Weather Sensor

7.1.2.3 **Main Electrical Enclosure Assembly.** The main electrical enclosure assembly (Figure 7.1.2) contains the subassemblies that generate the transmit frequency supplied to the transmitter head and the measurement and processing circuits that process the measurement data received from the receiver head. A fiberoptic module supplies an RS-232 communications link between the present weather sensor and the data collection package (DCP). The main electrical enclosure assembly also contains the system power supplies and temperature control circuitry. The signal processing circuitry consists of five printed circuit boards housed in a card rack. The board complement consists of a transmitter board, two signal processor boards (SP1 and SP2), a receiver AGC board, and a microprocessor board.

7.1.3 PRESENT WEATHER SENSOR CONFIGURATIONS

There is currently only one configuration of present weather sensor fielded. It is described in Section 7.1.2.

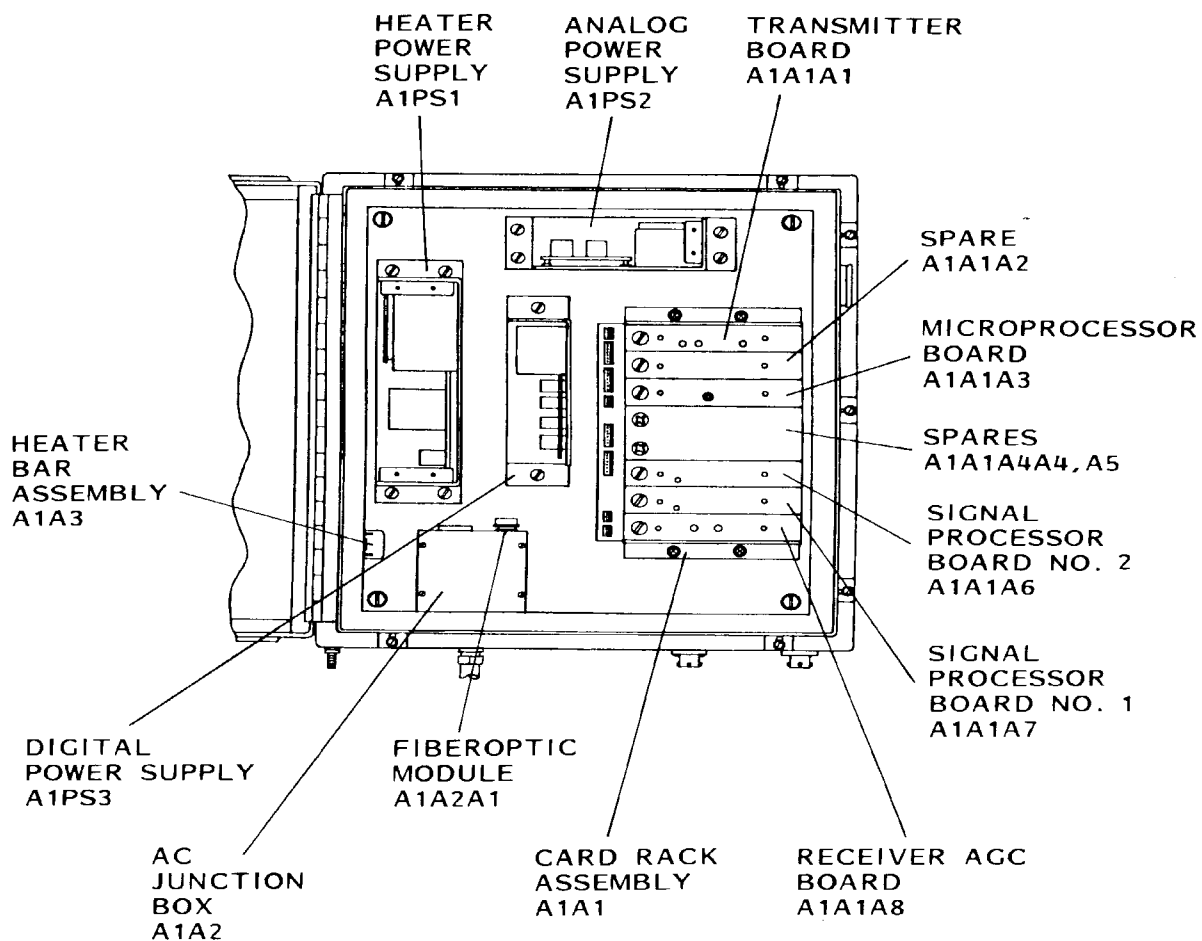


Figure 7.1.2. Present Weather Sensor